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The University of Melbourne

BACTERIOLOGY DEPARTMENT

Carlton, N.3, 19th September, 1955.

Dr. J. Lederberg,
Department of Genetics,
University of Wisconsin,
Madison 6,
WISCONSIN, U.S.A.

Dear Josh,

I was delighted to receive your letter indicating your interest in visiting Melbourne in 1957 and have now submitted your name and Esther's to the United States Educational Foundation under the categories of Fulbright Lecturer and Fulbright Research Scholar respectively. Mac Burnet, who will probably be writing to you, is equally enthusiastic over your proposed visit and will be only too happy to offer you hospitality at the bench during your stay in Melbourne. He will be acting as co-sponsor to my nomination.

In regard to projects which Esther could work on here this is a little difficult to forecast exactly what will be problems of current interest in two years hence. At the moment there are three research topics being investigated of direct and indirect genetical interest. One is concerned with mutants of Aspergillus niger which differ from the parent strain in producing significantly (6-fold) higher yields of citric acid than the parent Wisconsin strain 72-4. We are at present preparing papers for the Journal of General Microbiology on the nature and fermentative activity of these mutants and describing a technique of isolation and direct screening using a paper culture technique. The latter merely involves culturing isolated spores on absorbent paper previously soaked in medium containing a pH indicator. By measuring the size of the colony and the diameter of the acid zone produced we arrive at a ratio,

$$\text{the acid unitage } (= \frac{\text{diameter of acid zone}}{\text{diameter of colony}}).$$

Mutants with values greater than 5 are invariably high citric acid yielders. We know nothing of the genetics of this mutation. We are now trying to discover biochemically why they produce such high yields. One positive statement we can make is that the parent culture and mutants

metabolise citrate at an equal rate so that the lower yields of the parent culture is not due to the utilization of citric acid as it is formed.

(X) Another line of research deals with mutation towards non-lysogenicity in B. megaterium. The prophage of this organism is not firmly built into the chromosome structure so that non-lysogenic mutants are encountered. Dr. Huybers of this Department has found a mutation rate (loss of prophage) which may be as high as 4%. He looked for (λ)⁻ mutants of K12 and non-lysogenic Staphs. but failed to detect any in each organism. However, out of this he chanced upon a suicidal mutation in which the phage from the normal lysogenic Staph. will lyse mutant cells and the phage from the mutant cells will lyse the normal. Hence, culturing the normal and the mutant together results in mutual destruction. We call it here allelophagy (eat, each other)

Then, of course, there is the yeast work which I have no doubt will still be budding in '57. We are sure to have something going when Esther arrives.

Next week I shall be seeing Mr. Rossiter who is in charge of the U.S.A. Fulbright programme and should anything worth reporting arise from this I shall immediately let you know.

Finally, many thanks for the cultures which you sent us. Unfortunately three out of the five tubes were broken, but we recovered the organisms without cross contamination. It was an excellent idea to give us agar deeps instead of fluid suspension (this saved the day). I think you might warn your packer that it is a pretty tough journey to Australia and a lot of packing is required. Fulbrighters of course are handled more gently!

With best wishes to yourself and Esther,

Yours sincerely,

Fred

P.S. Last night I lost between the Department and home your reprint from the Waksman series of lectures on Microbiology and Genetics. Can I ask for a second one if available.

(X) This work is unpublished as comments would be welcome